FLIGHT DATA MONITORING (FDM) SYSTEMS AUDIT FORM

CMR.OPS.FORM.023

Audit of Cameroonian Operator's Systems Application of Flight Data Monitoring (FDM) Principles:	
To enable the Authority to discharge its responsibilities to ensure that operator's FDM is compliant with the requirements of Cameroon CARs, please use this document to review and record your FDM process and practice against the FDM requirements. This information will ensure that a less intrusive audit of the FDM during the next subsequent annual audit. **Completing This Form:** Please complete this form by entering information in the dedicated boxes. **Explanation of the Layout:** Each section starts with the main paragraph heading, the questions are then set out as below: 1. The **"Process Illustration"** – Please describe your process with reference to applicable documentation (attach documents where possible). 2. Answers to the **"Specific Evidence"** entries should give evidence to support the system description. 3. The **"Comments"** entry may be used to clarify the above and to highlight issues, future plans etc. Finally, we would like you to produce a top level FDM data summary using the sample spreadsheet format in **FORM: CMR.OPS.FORM.023A.**	
Please detail your organisation's processes against each principle and add any further comments that may be needed for clarification. Enter sufficient information such that a high-level audit approach will be able to verify the effectiveness of the FDM process. Questions about this document should be passed to: airops.oversight@ccaa.aero	**Operator's Details:** **Operator Name:** **Operator AOC No:** **Primary FDM Contact Person:** **Aircraft Types Covered:**
Information received will not be passed outside CCAA except in a de-identified and aggregated format. It is intended that a high-level report on the effectiveness of FDM within the industry will be generated.	
1. DEFINITION: Flight Data Monitoring (FDM) is the pro-active and non-punitive use of digital flight data from routine operations to improve aviation safety.	
Process Illustration	**Describe your process with reference to applicable documentation:**
1. Provide a high-level statement of your FDM system's safety objectives.	**1.**
2. What is your formal policy to address the risk management and conditions of use of FDM data?	**2.**
Specific Evidence	**Answers**
1. Provide evidence of a commitment to a non-punitive / just safety culture.	
2. a. Demonstrate the provision of resources for the capture, transcription, replay and analysis of FDM data. b. What are the manning levels / provision for your FDM? e.g. man days per month.	**2a.** **2b.**

3. Estimate for a typical month: a. the approximate time spent on the review and assessment of events. (in man days); b. the number of events; and c. the number of events individually reviewed per month.	**3a.**
	3b.
	3c.
Comments:	

2. ACCOUNTABILITY

The Manager responsible for the accident prevention and flight safety programme, which includes the FDM, is accountable for the discovery of issues and the transmission of these to the relevant manager(s) responsible for the process(es) concerned. The latter are accountable for taking appropriate and practicable safety action within a reasonable period of time that reflects the severity of the issue.

Note: While an operator may contract the operation of a flight data analysis programme to another party, the overall responsibility remains with the operator's accountable manager.

Process Illustration	Describe your process with reference to applicable documentation:
1. Is FDM included in an appropriate manager's responsibilities? If not, who is responsible?	1.
2. Who is responsible for the discovery and transmission of FDM issues?	2.
3. Who is responsible for taking action on FDM discovered issues?	3.
4. If a third party organisation analyses your FDM data, is there an agreement that sets out the demarcation between the FDM service provider's output and the operator's responsibility for taking action?	4.
Specific Evidence	Answers
1. Who is responsible for taking action upon Operational and Airworthiness issues raised in FDM?	1.
2. Demonstrate the training and background of your staff that enables them to fully understand the FDM process.	2.
Comments:	

3. OBJECTIVES:

An FDM will allow an operator to:

3.1 Identify areas of operational risk and quantify current safety margins.

3.2 Identify and quantify operational risks by highlighting when non-standard, unusual or unsafe circumstances occur.

3.3 Use the FDM information on the frequency of occurrences, combined with an estimation of the level of severity, to assess the safety risks and to determine which may become unacceptable if the discovered trend continues.

3.4 Put in place appropriate procedures for remedial action once an unacceptable risk, either actually present or predicted by trending, has been identified. 3.5. Confirm the effectiveness of any remedial action by continued monitoring.	
Process Illustration **Policy Statement and Procedures on:**	**Describe your process with reference to applicable documentation:**
1. How are risks identified by FDM fed into your risk management or Safety Management System?	1.
2. How do you decide if there are changing, especially increasing, levels of risks? Give an example.	2.
3. How would you describe your criteria for acceptance of a particular risk or initiating remedial action?	3.
4. Do you have a procedure for putting in place remedial action and ensuring it is carried out? (Note – this may fall outside FDM area.)	4.
5. Describe your process for deciding the success / failure criteria of follow-up actions.	5.
Specific Evidence	**Answers**
1. FDM and other safety measures and indicators make up a closed loop risk monitoring system. Give an example of the identification, assessment, action and then monitoring of results.	1.
2. How do you set an acceptable event rate to determine when action is needed?	2.
3. Give examples of effective remedial action taken because of FDM insight.	3.
Comments:	

4. FLIGHT RECORDER ANALYSIS TECHNIQUES:

1. Exceedencies Detection: This looks for deviations from flight manual limits, and standard operating procedures. A set of core events should be selected to cover the main areas of interest to the operator. The event detection limits should be continuously reviewed to reflect the operator's current operating procedures.
2. All Flights Measurements: A system that defines what is normal practice. This may be accompanied by retaining various snapshots of information from each flight.
3. Statistics: A series of measures collected to support the analysis process. These would be expected to include the numbers of flights flown and analysed, aircraft and sector details sufficient to generate rate and trend information.

Process Illustration	**Describe your process with reference to applicable documentation:**
1. Are your FDM events tailored to your particular operation or set to standard FDM supplier's defaults? Have you added additional events to cover known issues and if so what is your review process to keep the program up to date?	1.
2. Do you have a set of basic measures taken from every flight and if so how do you use them?	2.
3. What supporting statistics are used (e.g. flights/hours scanned,	3.

airfield movements etc.)?	
Specific Evidence	**Answers**
1. Give details of the FDM system used, e.g. supplier, recorder hardware used etc.	1.
2. Do you have access to full details of recorded parameters for all aircraft covered by the FDM?	2.
3. Do you have access to a complete list of current events, their logic and trigger levels?	3.
4. a. Does the program allow you to identify which sector all events occur on? b. Does the program allow you to use important discretes (stall warning, GPWS-modes, TCAS, autopilot/throttle etc.)? c. Please note any significant omissions.	4a. 4b. 4c.
5. How many flights and hours were flown and scanned by the program in the last year?	5.
6. Which aircraft has the highest overall event rate per 1000 arrivals/departures? Please give details	6.
Comments:	

5. FLIGHT RECORDER ANALYSIS, ASSESSMENT AND PROCESS CONTROL TOOLS:

The effective assessment of information obtained digital flight data is dependent on the provision of appropriate information technology tool sets. A program suite may include: Annotated data trace display, engineering unit listings, visualisation for the most significant incidents, access to interpretative material, links to other safety information, and statistical presentations.

Process Illustration	**Describe your process with reference to applicable documentation:**
1. Describe your data verification and validation process.	1.
2. Does our system provide data traces, listings and visualisations? Describe how these tools are regularly used.	2.
3. Do you have full access to interpretive material? (Flight Manuals, Operating Manuals etc.)	3.
4. What links do you have with other safety systems (Tech Logs, ASRs etc.) and how often are they used?	4.
Specific Evidence	**Answers**
1. Describe the basic bad data detection and validation routines which are built into your FDM to increase the quality of the	1.

analysed data.	
2. What percentage of the event produced are validated/examined in detail/individually?	2.
3. What proportion of your 'raw' events are invalid?	3.
4. FDM events should be tied in with relevant air safety reports or technical logs. Give examples that: a. indicate the number of times per month this is carried out; and b. show how this process is achieved by either a manual or automatic link.	4a.
	4b.
Comments:	

6. EDUCATION AND PUBLICATION

Sharing safety information is a fundamental principle of aviation safety in helping to reduce accident rates. The operator should pass on the lessons learnt to all relevant personnel and, where appropriate, industry.

Newsletters, flight safety magazines, highlighting examples in training and simulator exercises, periodic reports to industry and the regulatory authority.

Process Illustration	**Describe your process with reference to applicable documentation:**
1. What FDM reports are produced to a regular timescale?	1.
2. Which means of distributing safety messages, to crew or other relevant personnel, do you use? a. Newsletters or flight safety magazine. b. Simulator/train ing feedback. Other means – please specify.	2a
	2b.
	2c.
3. By what means do you inform the industry and the Authority of issues discovered through FDM?	3.
Specific Evidence	**Answers**
1. List the FDM trend and analysis reports given to management in the last year.	1.
2. List any other routine publications that contain FDM information circulated in the last year.	2.

3. Give details of both routine and one-off flight crew updates/ FCNs using FDM information.	3.
4. Give examples of how training utilises FDM data, including its use to construct relevant simulator scenarios.	4.
5. Give examples of how any other department use your FDM data.	5.
6. In which industry safety information exchange groups do you participate regularly?	6.
Comments:	

7. ACCIDENT AND INCIDENT DATA REQUIREMENTS

Those specified in Cameroon CARs ..... take precedence over the requirements of an FDM system. In there cases, the FDR data shall be retained as part of the investigation data and may fall outside the de-identification agreements.

Process Illustration	**Describe your process with reference to applicable documentation:**
1. Describe your procedures to retain and protect data if an accident or reportable incident takes place.	1.
Specific Evidence	**Answers**
1. Show how mandatory FDR data for serious incidents or accidents is handled.	1.
2. What are the FDM data processes when an incident or accident has occurred?	2.
3. Is FDM data substituted for the mandatory FDR data and if so on what authority?	3.
4. The use of FDM data may, on occasions, be appropriate background material to an investigation. Give details of any process in place to facilitate this under secured conditions. Has it been used?	4.
Comments:	

8. SIGNIFICANT RISK-BEARING INCIDENTS DETECTED BY FDM:

Every crew member has a responsibility to report events described in article 4 of the Implementing rules n°133/26/CEMAC/C/P/REX-CES on the reporting, analysis, and follow-up of occurrences in civil aviation, using the company occurrence reporting system. Occurrence Reporting is a requirement under article 4 (8) of the Implementing rules n°133/26/CEMAC/C/P/REX-CES on the reporting, analysis, and follow-up of occurrences in civil aviation

Significant risk bearing incidents detected by FDM will therefore normally be the subject of mandatory occurrence report by the crew. If this is not the case, then they should submit a retrospective report that will be included under the normal accident prevention and flight safety process without prejudice.

Process Illustration	**Describe your process with reference to applicable documentation:**
1. How do you confirm if an FDM exceedence has been the subject of a crew safety report.	1.
2. Describe how you estimate the severity of each FDM event or ASR and if it should be a mandatory report.	2.

3. If an ASR has not been submitted on a serious FDM detected event, how do you follow this up with the crew?	3.
4. What is your management approach to retrospective reporting?	4.
Specific Evidence	**Answers**
1. Do you knw how many ASRs have related FDM events?	1.
2. The correct functioning of both the FDM and ASR/MOR processes can be confirmed by cross-checking and associating FDM and relevant crew reports: a. Do you attempt this? b. If so, please give specific examples such as hard GPWS warnings, heavy landings, turbulence, tailscrapes etc.	2a. 2b.
3. FDM can be used to encourage and seek confirmation of crew compliance with ASR/MOR requirements. a. Is this done? If so please give an example of crews being requested to submit ASRs and their non-punitive treatment.	3.
Comments:	

9. DATA RECOVERY STRATEGY:

The data recovery strategy should ensure a sufficient capture of flight information to maintain an overview of operations. Data analysis should be performed sufficiently frequently to enable action to be taken on significant safety issues and to enable an operational performance investigation before crew members memories of the event can fade.

Process Illustration	**Describe your process with reference to applicable documentation:**
1. What are your data recovery objectives and targets?	1.
2. If not 100% recovery and analysis how did you determine what constituted a representative sample?	2.
3. What is your target for achieving timely processing and targets?	3.
Specific Evidence	Answers:
1. If not 100% describe how a representative capture covering all aspects of operations is ensured. (Types, bases, routes etc.)	1.
2. Give details of your systems recovery performance over the last year (as a percentage of flown flights/hours). a. What is the average for each fleet? b. What were the best and worst monthly figures for each fleet?	2a. 2b.

3. Explain any gaps in FDM coverage (e.g. technical issues, short term disposal plans) and provide evidence of CCAA dispensation.	3.
4. How is the FDM data used for ATQP (if applicable)? If not applicable is ATPQ being considered	4.
Comments:	

10. DATA RETENTION STRATEGY:

The data retention strategy should aim to provide the greatest safety benefits practicable from the available data. A full data set should be retained until the action and review processes are complete; therefore, a reduced data set relating to closed issues can be maintained for longer term trend analysis. Programme managers may wish to retain samples of de-identified full-flight data for various safety purposes (detailed analysis, training, benchmarking etc.).

Process Illustration	**Describe your process with reference to applicable documentation:**
1. What is your data retention policy?	1.
2. What is your identification and subsequent de-identification policy and timescales?	2.
3. What is your data destruction policy?	3.
4. What is your FDM data retention policy on ASRs/MORs?	4.
Specific Evidence	**Answers**
1. What is the target and normal timescales for investigation and assessment?	1.
2. How is the data from flight subject to MORs protected, retained and finally cleared for release?	2.
Comments:	

11. DATA ACCESS AND SECURITY:

Data Access and Security policy should restrict information access to authorised persons. When data access is required for airworthiness and maintenance purposes, a procedure should be in place to prevent disclosure of crew or flight identity.

Process Illustration	**Describe your process with reference to applicable documentation:**
1. What is your policy on access to FDM data?	1.
2. Provide a list of persons/posts with access, data views, and typical use of FDM data.	2.
3. Do you have a procedure for the secure Continued Airworthiness use of FDM data?	3.
Specific Evidence	**Answers**
1. Have you an audit trail for all access histories? If so give details of how this is accomplished.	1.
Comments:	

12. PROCEDURE DOCUMENT:

The conditions of use and protection given to participants should be defined in a procedure document acknowledged by all parties. This document, signed by all parties (airline management, flight crew member), will, as a minimum, define:

a) The aim of the FDM

b) A data access and security policy that should restrict access to information to specifically authorised persons identified by their position.
c) The method to obtain de-identified crew feedback on those occasions that require specific flight follow-up for contextual information;
d) The data retention policy and accountability including measures taken to ensure the security of the data.
e) The conditions under which, on rare occasions, advisory briefing or remedial training should take place; this should always be carried out in a constructive and non-punitive manner.
f) The conditions under which, the confidentiality may be withdrawn for reasons of gross negligence or significant continuing safety concern.
g) The participation of flight crew member representative(s) in the assessment of the data, the action and review process and the consideration of recommendations.
h) The policy for publishing the findings resulting from the FDM.

Process Illustration **A single document containing;**	**Describe your process with reference to applicable documentation:** **Refer to the document itself – if possible attach a copy**
1. Do you have such a document? If so, please indicate the items below that are included. If not give the reference to other document which contain equivalent sections.	1
2. Aims and objectives of FDM	2.
3. Detailed data access and security policy.	3.
4. The method to obtain de-identified crew feedback.	4.
5. The data retention policy.	5.
6. The conditions under which advisory briefing or remedial training should take place.	6.
7. The conditions under which the confidentiality may be withdrawn for reasons of gross negligence.	7.
8. The participation of flight crew representatives in the FDM process.	8.
9. The policy for publishing the findings resulting from FDM.	9.
Comments:	

13. AIRBORNE SYSTEMS AND EQUIPMENT:

Airborne systems and equipment used to obtain from FDM data will range from an already installed full Quick Access Recorder, in a modern aircraft with digital systems, to a basic crash protected recorder in an older or less sophisticated aircraft. The analysis potential of the reduced data set available in the latter case may reduce the safety benefits obtainable. The operator shall ensure that FDM use does not adversely affect the serviceability of equipment required for accident investigation.

Process Illustration	**Describe your process with reference to applicable documentation:**
1. Describe your means of FDM data storage and recovery including outlines of your installation, test and maintenance procedures.	1.
2. If mandatory recorders are used for FDM what procedures are in place to minimise the effect on their serviceability?	2.
3. What entry for QAR has been added to the Minimum Equipment List?	3.
Specific Measures	**Answers**

1. What technology is used to obtain FDM data? e.g. WQAR, PQAR, OQAR, MQAR, Mandatory FDR.	1.
2. If a crash recorder is used: a. Is it solid state or tape? b. How is full data recovery ensured (25/50hr recycle time)?	2.
3. Describe processes, other than basic FDM, that are dependent upon FDM data.	3.
4. What are your MEL procedures for departure with an unserviceable QAR device?	4.
Comments:	